

Name

Key

Date

Radical Practice—Addition/Subtraction/Multiplication/Breakdown/division

1. $2\sqrt{5} + 4\sqrt{5}$

$$6\sqrt{5}$$

2. $7\sqrt{3} - 3\sqrt{3}$

$$4\sqrt{3}$$

3. $2\sqrt{6} - 7\sqrt{6}$

$$-5\sqrt{6}$$

4. $5\sqrt{x} + 1\sqrt{x}$

$$6\sqrt{x}$$

5. $9\sqrt{5} - 7\sqrt{5}$

$$2\sqrt{5}$$

6. $6\sqrt{7} + 3\sqrt{3} - 2\sqrt{7}$

$$4\sqrt{7} + 3\sqrt{3}$$

7. $\sqrt{2} - 4\sqrt{6} + 5\sqrt{2} + \sqrt{6}$

$$6\sqrt{2} - 3\sqrt{6}$$

8. $2\sqrt{3} - 6\sqrt{3} - 3\sqrt{3}$

$$-7\sqrt{3}$$

BREAKDOWN 1ST

9. $3\sqrt{12} + 4\sqrt{3}$

$$\begin{array}{c} \uparrow 3 \\ 6\sqrt{3} + 4\sqrt{3} \\ 10\sqrt{3} \end{array}$$

10. $8\sqrt{5} - 2\sqrt{45}$

$$\begin{array}{c} \uparrow 5 \\ 8\sqrt{5} - 6\sqrt{5} \\ 2\sqrt{5} \end{array}$$

11. $7\sqrt{18} + 2\sqrt{50}$

$$\begin{array}{c} \uparrow 2 \quad \uparrow 2 \\ 21\sqrt{2} + 10\sqrt{2} \\ 31\sqrt{2} \end{array}$$

12. $6\sqrt{24} - 5\sqrt{54}$

$$\begin{array}{c} \uparrow 6 \quad \uparrow 6 \\ 12\sqrt{6} - 15\sqrt{6} \\ -3\sqrt{6} \end{array}$$

13. $4\sqrt{48} - \sqrt{27}$

$$\begin{array}{c} \uparrow 3 \quad \uparrow 3 \\ 16\sqrt{3} - 3\sqrt{3} \\ 13\sqrt{3} \end{array}$$

14. $5\sqrt{8} + \sqrt{98}$

$$\begin{array}{c} \uparrow 2 \quad \uparrow 2 \\ 10\sqrt{2} + 7\sqrt{2} \\ 17\sqrt{2} \end{array}$$

15. $2\sqrt{90} - 3\sqrt{20} + \sqrt{40}$

$$\begin{array}{c} \uparrow 10 \quad \uparrow 5 \quad \uparrow 10 \\ 6\sqrt{10} - 6\sqrt{5} + 2\sqrt{10} \\ 8\sqrt{10} - 6\sqrt{5} \end{array}$$

16. $7\sqrt{3} + \sqrt{48}$

$$\begin{array}{c} \uparrow 3 \\ 7\sqrt{3} + 4\sqrt{3} \\ 11\sqrt{3} \end{array}$$

17. $7\sqrt{12} - 5\sqrt{27}$

$$\begin{array}{c} \uparrow 3 \quad \uparrow 3 \\ 14\sqrt{3} - 15\sqrt{3} \\ -\sqrt{3} \end{array}$$

18. $4\sqrt{44} + 2\sqrt{22}$

$$\begin{array}{c} \uparrow 11 \\ 8\sqrt{11} + 2\sqrt{22} \end{array}$$

19. $\sqrt{5} \cdot \sqrt{3}$

$$\sqrt{15}$$

20. $\sqrt{6} \cdot \sqrt{2}$

$$\begin{array}{c} \sqrt{12} \\ \uparrow 3 \\ 2\sqrt{3} \end{array}$$

21. $\sqrt{3} \cdot \sqrt{6}$

$$\begin{array}{c} \sqrt{18} \\ \uparrow 2 \\ 3\sqrt{2} \end{array}$$

22. $3\sqrt{2} \cdot 4\sqrt{6}$

$$\begin{array}{c} 12\sqrt{12} \\ \uparrow 3 \\ 24\sqrt{3} \end{array}$$

23. $5\sqrt{8} \cdot 2\sqrt{3}$

$$\begin{array}{c} 10\sqrt{24} \\ \uparrow 6 \\ 20\sqrt{6} \end{array}$$

24. $-5\sqrt{3} \cdot 4\sqrt{6}$

$$-15\sqrt{18}$$

$$\uparrow$$

$$9 \cdot 2$$

$$-45\sqrt{2}$$

25. $7\sqrt{3} \cdot 2\sqrt{10}$

$$14\sqrt{30}$$

26. $\sqrt{8} \cdot 2\sqrt{5}$

$$2\sqrt{40}$$

$$\uparrow$$

$$4 \cdot 10$$

$$4\sqrt{10}$$

27. $5\sqrt{15} \cdot \sqrt{3}$

$$5\sqrt{45}$$

$$\uparrow$$

$$9 \cdot 5$$

$$15\sqrt{5}$$

28. $\sqrt{5} \cdot \sqrt{10}$

$$\sqrt{50}$$

$$\uparrow$$

$$25 \cdot 2$$

$$5\sqrt{2}$$

29. $\frac{\sqrt{15}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$$\frac{\sqrt{30}}{2}$$

30. $\frac{5}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$$\frac{5\sqrt{2}}{2}$$

31. $\frac{\sqrt{21}}{\sqrt{3}} = \sqrt{7}$

32. $\frac{12}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}}$

$$\frac{12\sqrt{6}}{6}$$

$$= 2\sqrt{6}$$

33. $\frac{\sqrt{8}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$$\frac{\sqrt{40}}{5} = \frac{2\sqrt{10}}{5}$$

34. $(3\sqrt{2})^2$

$$9 \cdot 2$$

$$18$$

35. $(5\sqrt{3})^2$

$$25 \cdot 3$$

$$75$$

36. $(4\sqrt{5})^2$

$$16 \cdot 5$$

$$80$$

37. $(7\sqrt{2})^2$

$$49 \cdot 2$$

$$98$$

38. $(3\sqrt{9})^2$

$$9 \cdot 9$$

$$81$$

39. $\frac{\sqrt{7}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$$\frac{\sqrt{14}}{2}$$

40. $\frac{8}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$$\frac{8\sqrt{3}}{3}$$

41. $\frac{10}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$$\frac{10\sqrt{5}}{5}$$

$$2\sqrt{5}$$

42. $\frac{12}{\sqrt{4}} \cdot \frac{\sqrt{4}}{\sqrt{4}}$

$$\frac{12}{2}$$

$$6$$

43. $\frac{\sqrt{6}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$$\frac{\sqrt{12}}{2}$$

$$\frac{2\sqrt{3}}{2} = \sqrt{3}$$

44. $\sqrt{4(a^2 + b^2)}$

$$2\sqrt{a^2 + b^2}$$

45. $\sqrt{8(a^2 + b^2)}$

$$2\sqrt{2(a^2 + b^2)}$$

46. $\sqrt{(12a^2 + 12b^2)}$

$$\sqrt{12(a^2 + b^2)}$$

$$2\sqrt{3(a^2 + b^2)}$$

47. $\sqrt{(9a^2 + 9b^2)}$

$$\sqrt{9(a^2 + b^2)}$$

$$3\sqrt{a^2 + b^2}$$